# Exercises: Class Inheritance and Prototypes

Problems for exercises and homework for the [“JavaScript Advanced” course @ SoftUni](https://softuni.bg/courses/javascript-advanced). Submit your solutions in the SoftUni judge system at [https://judge.softuni.bg/Contests/339/.](https://judge.softuni.bg/Contests/339/)

## Person and Teacher

Write a JS **class** Person **and a class** Teacher **which extends** Person**.** A Person should have a name and an email. A Teacher should have a name, an email, and a subject.

### Input

There will be no input.

### Output

Your function should return an object containing the classes Person and Teacher.

### Example

|  |
| --- |
| template.js |
| **function** *personAndTeacher*() {  *//****TODO* return** {  ***Person***,  ***Teacher*** } } |

## Inheriting and Replacing ToString

Extend the Person and Teacher from the previous task and add a class Student inheriting from Person. Add toString() functions to all classes, the formats should be as follows:

* Person - returns **"*Person (name: {name}, email: {email})"***
* Student - returns ***"Student (name: {name}, email: {email}, course: {course})"***
* Teacher - returns ***"Teacher (name: {name}, email:{email}, subject:{subject})"***

Try to reuse code by using the toString function of the base class.

### Input

There will be no input.

### Output

Your function should return an object containing the classes Person, Teacher and Student.

### Example

|  |
| --- |
| template.js |
| **function** *toStringExtension*() {  *//****TODO* return** {  ***Person***,  ***Teacher,***  ***Student*** } } |

## Extend Prototype

Write a JS **function which receives a class and attaches to it a property** species **and a function** toSpeciesString(). When called, the function returns a string with format:

I am a <species>. <toString()>

The function toString is called from the current instance (call using this).

### Input

Your function will receive a class whose prototype it should extend.

### Output

There is no output, your function should only attach the properties to the given class’ prototype.

### Example

|  |
| --- |
| template.js |
| **function** *extendClass*(classToExtend) {  *//****TODO*** } |

## Class Hierarchy

Write a JS function that returns 3 classes - Figure, Circle, Rectangle.

Figure:

* should be abstract (cannot be instantiated)

Circle:

* extends Figure.
* has a property radius
* overrides area getter to return the area of the Circle (PI \* r \* r)
* toString() - should return a string representation of the figure in the format **"{type} - radius: {radius}"**

Rectangle

* extends Figure
* has properties width and height
* overrides area getter to return the area of the Rectangle (width \* height)
* toString() - should return a string representation of the figure in the format **"{type} - width: {width}, height: {height}"**

### Input

There will be no input.

### Output

Your function should return an object containing the Figure, Circle and Rectangle classes.

### Examples

This code demonstrates how your classes should behave:

|  |
| --- |
| Sample Code |
| **let *f*** = **new** Figure(); ***//Error*****let *c*** = **new** Circle(5);  **console**.log(***c***.area); ***//78.53981633974483*** **console**.log(***c***.toString()); ***//Circle - radius: 5*****let *r*** = **new** Rectangle(3,4);  **console**.log(***r***.area); ***//12*** **console**.log(***r***.toString()); ***//Rectangle - width: 3, height: 4*** |